



TITLE:

<Note>Inquiry into the relation
between Japanese word
processors and the MSX personal
computer series

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CITATION:

SUZUKI, Mana. <Note>Inquiry into the relation between Japanese word processors and the MSX personal computer series. 科学哲学科学史研究 2016, 10: 70-77

ISSUE DATE:

2016-03-31

URL:

<https://doi.org/10.14989/210108>

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Inquiry into the relation between Japanese word processors and the MSX personal computer series

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§1 Introduction

This study discusses differences between Japanese word processors and word-processing software for 8-bit personal computers called MSX at the time.

From the late 1970s to the early 1980s, many Japanese companies introduced 8-bit personal computers to the market. In 1976, the TK-80, a do-it-yourself microcomputer kit, was a great success. Not only computer engineers but also hobbyists bought it (IPSJ b). That success encouraged NEC, which introduced the TK-80, to sell its personal computers, including the PC-8001, PC-6001, and others (Tomita). Among computers, those from NEC, Sharp, and Fujitsu (or Hitachi) were especially popular, and these are known as the Big Three of the 8-bit generation (IPSJ c). In 1983, the ASCII Corporation, a Japanese publishing company, together with Microsoft Japan announced a standard architecture for 8-bit personal computers, called MSX.¹ Around that time, however, 16-bit personal computers were becoming more popular. ASCII regarded the 8-bit architecture of personal computers, which had become established, as suitable for home personal use because they could be produced at low cost.

The video game machine, Nintendo Entertainment System (hereinafter, NES ; also known as Nintendo Famicom) was also released in 1983. Masayuki Uemura, a member of the development team for the NES, has acknowledged that the team was strongly aware of the existence of MSX. He recalled:

(When, in the end of 1983, Nintendo recalled Nintendo Famicom because of

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¹ MSX was updated in 1985, 1988, and 1991. Further discussion of MSX is beyond the scope of this article.

the fault in the LSI [large-scale integrated circuit],) the team had deep misgivings about the death of Nintendo Famicom, especially because home entertainment manufacturers in Japan announced the release of MSX machines one after another. (Uemura, Hosoi, and Nakamura 2013, p. 122).

Additionally, the media were wondering why Nintendo was releasing the video game machine, because at that time Atari's video game machine had already failed commercially in the US (Uemura, Hosoi, and Nakamura 2013, pp. 58–67, p. 108). In contrast with general-purpose personal computers, the NES enabled video games only; the advantage of personal computers such as MSX seemed obvious to the media.

However, there is evidence that the advantage of the MSX machine as a general-purpose computer was not appreciated by consumers. Teenagers of the time had two choices: the NES or a personal computer, such as an MSX machine. Ultimately, they became more attached to the NES system than to personal computers. The perception of NES from the MSX side is described in a digital book *Weekly ascii special edition MSX 30th anniversary: the history and future of beloved MSX*, which uses serial articles from a website and weekly magazine in 2013 as its sources. It refers to NES as follows.

NES, specialized in video games, beat MSX machines, which were not specialized in video games. This is a fact of history. We appreciate the opinion of some that, “NES isn't a rival product to MSX because MSX is not a video game machine.” The market, however, regarded MSX as a video game machine. (MSX Association 2013, p. 4)

This market perception seems to suggest that the computing capabilities offered by MSX machines beyond video games, such as word processing, calculating, and programming, were not important to consumers. But why was that? Let us investigate the case of word processing. Word processing has been important for the spread of computers (both personal computers and word processors) because it was in high demand. Although MSX machines seem to have been considered a kind of video game machine by the market, they are personal computers and capable of word processing, calculating, programming, and other task. Meanwhile, Japanese word processors are only capable of word processing. For a Japanese speaker wanting a computer for word processing, either a specialized

word processing machine or a general-purpose personal computer with word processing software could be used. In this comparison, MSX machines had little chance to meet the demand for word processing because Japanese word processors were superior to the word-processing software available for MSX machines.

§2 Japanese word processors

In the first half of the 1980s in Japan, Japanese word processors were quickly developed. Before that, there was no practical way to input a sentence containing kanji and kana mechanically.

Naturally, Japanese users were eager to have computers that can process Japanese text. For example, if Japanese speakers want to use a computer for the purpose of education, the computer needs to be capable of showing Japanese phonetic characters (*kana*) and Chinese ideographic characters (*kanji*) on the display. Generally, the Japanese written language requires at least 2000 characters (IPSJ 2010, p. 24; Kawada et al. 1979, p. 238). It was a great problem to establish a Japanese input method that is easy to use. In the mid-1950s, newspaper companies began to use telegraphs to send Japanese text. To allow this, some Japanese teletypewriters were developed. One kind of these, multilevel-shift keyboards,² had 192 keys with 12 characters assigned to each key. Although skilled typists could input about 70 to 100 characters per minute (IPSJ 2010, p. 24), these were hard for untrained people to use. During the 1960s and 1970s, some other input devices were also developed, but none of those methods gained popularity because they were all hard to master. As an example of input on the type of device described above, to input the kanji “犬” (“dog”), the key that corresponds to 犬 must be found.

In 1978, Toshiba developed the Japanese word processor, JW-10. This was the first word processor that had users input kana and converted them to kanji (IPSJ 2010, p. 133). Fig.1 was the functional blockdiagram of JW-10 presented by engineers at Toshiba. Today kana-to-kanji conversion is used commonly as an input method for Japanese text. In this method, to input the kanji “犬”, a user inputs the corresponding kana “いぬ” (transliteration: *i nu*, that is, the user types the pronunciation of 犬. Because Japanese has

² They were used by kanji teletypewriters, which were first produced as a test by The Yomiuri Shimbun newspaper and the Japan Defense Agency in 1954 (IPSJ 2010, p. 24).

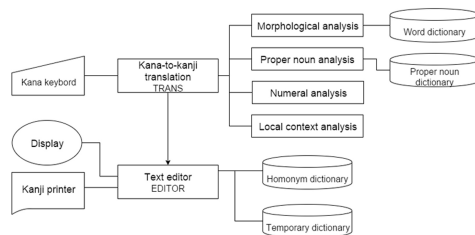


Fig. 1 Functional blockdiagram of JW-10⁴

many homonyms, accurate kana-to-kanji conversion requires dictionaries, syntax analysis, and semantic analysis, but during the 1960s and 1970s, the study of natural language processing was not yet sufficient for this (IPSJ 2010, pp. 130–131).

Moreover, the software development environment was not adequate. For instance, the character set for the standard kana and kanji symbols was not established as a Japanese Industrial Standard until 1978 (IPSJ 2010, p. 28). Before this, researchers in the field typically had to prepare the character set themselves. This situation started to change when an easier-to-use input method was developed in the late 1970s.

In the mid-1980s, kana-to-kanji conversion became common among Japanese word processors. The price of Japanese word processors dropped rapidly. In 1980, the average price of a word processor was more than 1.6 million yen;⁵ by 1985, it was less than 200 thousand yen.⁶ (Kura 2004, p. 8) Further, the machines became lighter and smaller, and many portable word processors were on the market by about 1985.

Turning to personal computers and word-processing software, in 1982, the year before the MSX was announced, NEC released a 16-bit personal computer, the PC-9801, which was the first of the PC-9800 series. This series was adopted widely throughout Japan (IPSJ a). Word-processing software for the PC-9801 was useful, but it was still much more expensive than dedicated word processors.

Nikkei Personal Computing, which was one of the computer magazines, made into a table the price of word-processing software and Japanese word processors. If we intended

⁴ Kawada et al. 1979, p. 239. “Kana-to-kanji translation” means kana-to-kanji conversion.

⁵ About 6,700 dollars in January 1980 (BankJ).

⁶ About 784 dollars in January 1985 (BankJ).

to use PC-9801 series for word processing, it cost one million yen (Nikkei personal computing 1985, p. 102). It was also said that Japanese word processors were cost-effective but personal computers such as PC-9801 series were hopeful because they had an advantage to compatibility and expandability (Nikkei personal computing 1985, pp. 96–98). Although the difference between dedicated word processors and personal computers narrowed after a few years, there was still a marked difference in 1985.

§3 MSX model computers and Japanese word processing software

From the viewpoint of word processing, Japanese word processors were more useful than MSX machines. The fact was shown by the article on MSX machines.

ASCII published the computer magazine *MSX Magazine* from 1983 to 1992. The October 1985 issue of *MSX magazine* carried a special feature article on Japanese word processors and word-processing software for MSX (*MSX Magazine* 1985).

This article introduced two word processors, the Rupo (JW-R10) by Toshiba and the HW-30 by Sony (*MSX Magazine* 1985, pp. 55–57). These models had been recently introduced to the market and also used kana-to-kanji conversion as the JW-10 did. Although their displays were small, they had a built-in printer and a price of about ten thousand yen. Of particular interest, the Rupo had a function for phrase conversion of input (IPSJ d).

Recall that Toshiba had developed the first Japanese word processor (the JW-10) whose input method was kana-to-kanji conversion. It is frequently hard for Japanese speakers to translate Japanese sentences from pure kana into an appropriate mix of kana and kanji because Japanese includes many homonyms. One method of providing hints for such conversion is to divide sentences written in kana into pause groups. For example (Kawada et al. 1979, p. 238–239), there is a phrase that is written in Kana as “にわにはにわにわとり” (*ni wa ni ha ni wa ni wa to ri*).⁷ This phrase means “two hens in the garden.” To translate this sentence into kana and kanji on the JW-10, it is necessary to insert spaces into the sentence to form pause groups, as “にわ には にわ にわとり”. Then, the

⁷ In Japanese, when “は” is used as a postpositional particle, it is pronounced “WA”. Still, to input “は” for kana-to-kanji conversion, “HA”, its usual pronunciation, is typed.

JW-10 could translate it into the natural Japanese sentence, “庭には二羽鶏”.⁸

The Rupo, using phrase conversion input, could divide a sentence into pause groups automatically, allowing it to translate a sentence from kana input into a mixed kana and kanji output. This function is quite convenient because it narrows down the list of kanji (suggested candidates) by guessing from the context, and users at that time attached great importance to it.

In contrast, word processing software for MSX machines was much less convenient. The *MSX Magazine* article described how to use an MSX machine as a word processor (MSX Magazine 1985, pp. 58–65). To use an MSX machine as a word processor, word-processing software and a kanji-character ROM had to be purchased. A kanji-character ROM is an external device that contains the font set for kanji characters. MSX machines could not display kanji characters without a kanji-character ROM. The ROM alone cost between thirty thousand and forty thousand yen (MSX Magazine 1985, p. 59, 61). Toshiba, too, developed word-processing software for MSX (MSX Magazine 1985, pp. 58–59), but it lacked phrase conversion input. Instead, Toshiba’s word-processing software, Kanji-kun, provided a list of kanji with the same pronunciation. For example, to input “生” (*se i*), which means life, it was necessary to input “せい” (*textitse i*) and then select the correct kanji from a list of candidate kanji in which all kanjis are pronounced *se i*, presented as 生, 世, 聖, 制, 精, 静, and many more. This is obviously inconvenient because it does not consider the context. Moreover, to print a document out, it was necessary to buy a printer. Because of these requirements, to use an MSX machine for word processing required more than ten or twenty thousand yen. Thus, for word processing, a word processor was preferable to an MSX machine.

§4 Discussion

Fundamentally, Japanese sentences are more difficult for computers to handle than English sentences are. Therefore, computers for Japanese word processing require better performance. MSX machines were limited performance to keep prices lower in an effort to sell to the home-use market. If MSX machines had had better performance, then they

⁸ “庭” means garden, “二羽” means two birds (the number two followed by the counter suffix for birds and rabbits) and “鶏” means hens.

would have competed more successfully with Japanese word processors. Instead, MSX machines were priced similarly to dedicated video game machines, and there was a high level of interest in video games among teenage users. The educational use of personal computers was not promoted in Japan during the 1980s, and so low-priced computers (such as the MSX machines) could not expand into the educational market.

The history discussed above explains why MSX machines competed against video game machines. In this paper, I limited the discussion to MSX machines. However, it should be studied further what the role of 8-bit personal computers were in the first half of the 1980s in Japan. In 1986, in the article of *Nikkei Personal Computing*, Isoda reported that electric-appliance makers avoided the low-priced computers for gaming and promoted high-performance 8-bit personal computers, which had a built-in floppy disk drive and competed against 16-bit personal computers (Isoda 1986). A continuous examination of 8-bit personal computers besides the MSX (for example, the PC-8001 or the FM-8) would clarify the history of personal computers in 1980s in Japan.

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